

THE CALIFORNIAN LAND SHELLS OF THE EPIPHRAGMOPHORA TRASKII GROUP.

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INTRODUCTION.

Some material recently received by the United States National Museum has made it necessary to subject this group to an examination, which has yielded some rather interesting results. Foremost among these may be mentioned the assigning of a final resting place to *Helix carpenteri* Newcomb, a name that has been applied erroneously to at least three different forms since it was established. It was therefore quite a satisfaction to find a shell in the type locality that satisfies all requirements of Doctor Newcomb's diagnosis and will fix, it is to be hoped, this name forever.

In this study I have been greatly aided by having had at my disposal the entire series of the group contained in the collection of the Philadelphia Academy of Natural Sciences, which was kindly loaned to me by Dr. H. A. Pilsbry. I am also indebted to Prof. G. D. Harris, of Cornell University, for the loan of Newcomb's four cotypes of *Epiphragmophora traskii*, and to Dr. S. S. Berry, of Redlands, California, for the loan of two paratypes of his *Epiphragmophora petricola*.

The figures accompanying the sketch are after photographs retouched by Mrs. E. B. Decker.

GROUP CHARACTERS.

The group of *Epiphragmophora traskii* is characterized by having the nucleus, which usually forms one and one-half to two turns, very finely axially wrinkled and provided with a scanty number of rather distantly spaced, slightly elongated papillae, that form obliquely, protractively slanting curved lines. The sculpture of the succeeding turns may be papillose or spirally striate or both. The postnuclear whorls may be all, or in part, marked by incised spiral striations, which vary in strength in the different races, from microscopic to strongly incised. The last whorl is never malleated, as in the group of *Epiphragmophora tudiculata*, which has the nuclear sculpture like that of the present group.

SPECIFIC CHARACTERS.

The material examined readily breaks up into two subgroups, which we shall consider species.

The southern species, *Epiphragmophora cuyamacensis*, has the last whorl uniform papillose above and below, while in the northern, *Epiphragmophora traskii*, the last whorl lacks the uniform papillations.

KEY TO SUBSPECIES.

- a*¹, Shell papillose above and below on all the whorls. *E. cuyamacensis*, p. 610.
- b*¹, Umbilicus half closed by the reflected inner lip; greater diameter 25 mm.,
 - c*¹, *c. avus*, p. 610.
- b*², Umbilicus not half closed by the reflected inner lip; greater diameter less than 21 mm.
 - c*¹, Papillations uniform over entire base. *c. venturensis*, p. 611.
 - c*², Papillations not uniform over entire base.
 - d*¹, Papillations obsolete on the rounded portion of base a little behind the aperture. *c. cuyamacensis*, p. 611.
- a*¹, Shell not papillose above and below on all the whorls. *E. traskii*, p. 610.
- b*¹, Obliquely protractively slanting lines of papillae on the nucleus, very faint.
 - c*¹, Shell subglobose. *t. tularica*, p. 615.
 - c*², Shell decidedly depressed.
 - d*¹, Shell large, diameter of type 31 mm. *t. zechae*, p. 615.
 - d*², Shell smaller, diameter of type. 20 mm. *t. proles*, p. 616.
- b*¹, Obliquely protractively slanting lines of papillae on the nucleus, well developed.
 - c*¹, Surface of shell with clothlike sculpture. *t. coronadoensis*, p. 617.
 - c*², Surface of shell not with clothlike sculpture.
 - d*¹, Umbilicus narrow, more than half covered by the reflected inner lip.
 - e*¹, Shell decidedly inflated. *t. coelata*, p. 617.
 - e*², Shell not inflated. *t. carpenteri*, p. 617.
 - d*², Umbilicus wide, less than half covered by the reflected inner lip.
 - e*¹, Papillation on whorls succeeding the nuclear turns stronger than those on the nucleus. *t. phlyctaena*, p. 618.
 - e*², Papillation on whorls succeeding the nuclear turns not stronger than those on the nucleus. *t. traskii*, p. 612.

EPIPHRAGMOPHORA CUYAMACENSIS AVUS, new subspecies.

Plate 116, figs. 16-18.

This is a giant race resembling the large form of typical *Epiphragmophora traskii*. It has the inner lip reflected over half of the rather narrow umbilicus. The entire upper surface and the inside of the umbilicus are strongly papillose, while the rounded basal portion is almost smooth, the lines of growth being the most conspicuous feature. The spiral sculpture is obsolete.

The type (Cat. No. 120588, U.S.N.M.) comes from Los Angeles County, California. It has 5.5 whorls and measures—greater diameter, 25 mm.; altitude, 14.6 mm.

EPIPHRAGMOPHORA CUYAMACENSIS VENTURENSIS, new species.

Plate 116, figs. 13-15; plate 117, fig. 7.

Shell very much like *Epiphragmophora cuyamacensis cuyamacensis*, but with coarser papillation, which does not become obsolete behind the aperture on the rounded portion of the base, but is as strongly developed here as on the rest of the shell.

The type (Cat. No. 39642*a*, U.S.N.M.) was collected by L. Yates in Ventura County, California. It has 5.6 whorls and measures—greater diameter, 20.3 mm.; altitude, 12 mm. Another specimen without specific locality (Cat. No. 60611, U.S.N.M.) has 5.7 whorls and measures—greater diameter, 20.1 mm.; altitude, 12 mm.

EPIPHRAGMOPHORA CUYAMACENSIS CUYAMACENSIS, new species.

Plate 116, figs. 10-12; plate 117, fig. 8.

Epiphragmophora traskii cuyamacensis (Hemphill) PILSBRY, Man. Conch., vol. 9, 1894, p. 199, *nomen nudum*.

Epiphragmophora traskii cuyamacensis (Hemphill) PILSBRY, Clas. Cat. with Loc. Land Shells of Amer. North Mex., 1907, p. 5, *nomen nudum*.

Shell openly umbilicated; inner lip only slightly reflected over the umbilicus. Surface evenly papillated above and below, excepting a small portion on the rounded part of the base a little behind the aperture, which may be almost smooth.

Cat. No. 62381, Philadelphia Academy Collection, contains the type, three adult and nine immature specimens, which were collected by Mr. Henry Hemphill at the Cuyamaca Mountains in San Diego County, California. These are the specimens referred to by Doctor Pilsbry in the citations given above. The type has 5.9 whorls and measures—greater diameter, 20.1 mm.; altitude, 11.7 mm.

We have seen the following adult specimens, all collected by Mr. Hemphill:

Collection.	Catalogue number.	Number of whorls.	Greater diameter.	Altitude.	Locality.
P.A.N.S.....	62387	5.9	20.1	11.7	San Diego County, California.
Do.....	62387	5.9	19.2	11.7	Do.
Do.....	62387	5.6	17.0	10.4	Do.
Do.....	62387	5.6	16.0	10.2	Do.
U.S.N.M.....	39646	5.6	20.1	12.5	San Diego mines.
Do.....	39646	5.3	19.3	12.0	Do.
Do.....	30520	5.4	20.2	11.0	San Diego County, California.

Two young specimens in Mr. F. W. Kelsey's collection from Paloma Mountains, San Diego County, California, were examined.

EPIPHRAGMOPHORA TRASKII TRASKII (Newcomb).

Plate 114, figs. 1-18; plate 117, figs. 1-3.

- Helix traskii* NEWCOMB, Proc. Cal. Acad. Nat. Sci., vol. 2, 1861, pp. 91-92.
Aglaja traskii TRYON, Amer. Journ. Conch., vol. 2, 1866, p. 314, pl. 5, fig. 16.
Arionta traskii W. G. BINNEY, Terr. Moll., vol. 5, 1878, p. 369.
Helix franki J. G. COOPER, err. typ.; teste J. G. C., in letters.
Epiphragmophora traskii PILSBRY, Tryon's Man. Conch., vol. 9, 1894, p. 199.
Epiphragmophora traskii major HEMPHILL, *nomen nudum*.
Epiphragmophora traskii verna HEMPHILL, *nomen nudum*.
Epiphragmophora traskii saucius HEMPHILL, *nomen nudum*.
Epiphragmophora petricola BERRY, Univ. Cal. Pub. Zool., vol. 16, No. 9, Jan. 1916, pp. 107-9.

In this subspecies the fine papillation of the nuclear whorls scarcely extends beyond the third turn and is never stronger on the turns that succeed the nucleus than on the nucleus.

I have seen Dr. Newcomb's cotypes, four specimens, which are in the collection of Cornell University, No. 27832, and I have figured one of these on plate 116, as figures 7-9. These four specimens which come from Los Angeles, California, yield the following measurements:

Number of whorls.	Greater diameter.	Altitude.
5.6	22.6	13.7
5.8	22.1	12.6
5.9	22.3	13.3
5.6	23.2	13.9

To this subspecies I must refer Hemphill's *Epiphragmophora traskii major*, *E. t. verna*, and *E. t. saucius*. The first of these simply represents the largest shells of the group, while the green tinge of *E. t. verna* Hemphill, which is fugitive, is characteristic of all fresh specimens. The somewhat smaller average in size of the series of shells, which Hemphill named *verna*, is due to a partially diseased condition of the whorls.

Epiphragmophora traskii saucius Hemphill, as selected by the author of that name, represents pathologic specimens. It is *E. t. verna* carried a little further, pathologically speaking.

I have seen two paratypes of Mr. Berry's *Epiphragmophora petricola*, and I give figures of one of these on plate 117, figures 1-3. These specimens must be assigned to typical *Epiphragmophora traskii traskii*. Mr. Berry's ecologic data given in the paper referred to above are rather interesting since they throw considerable light on the habits of these animals. I therefore quote from his paper:

Type.—Cat. No. 3480 of the writer's collection; paratypes in the collections of the University of California and the private collection of Mr. Allyn G. Smith.

Type-locality.—A rocky talus slope on the southeast wall of Mill Creek Canyon, San Bernardino Mountains, California, near the old road, about 1-1/2 miles from the canyon

mouth, altitude about 3,250 feet; 10 dead shells, A. G. Smith and S. S. Berry, January 7, 1914; three living specimens, A. G. Smith, May 12, 1914; one living specimen, S. S. Berry, April 8, 1915.

Remarks.—This fine helicoid, one of the largest of the southern fauna, is distinguished by the aforementioned characters from all others known to me. It perhaps resembles a very large and extremely flattened form of *E. traskii* more than any of the other Californian species, and I believe the two species to be rather nearly allied, though the situations in which they are respectively to be found are very dissimilar. *E. petricola* was first discovered while quarrying through a rocky slide in the possible hope of obtaining *Micrarionta* or *Sonorella*, genera as yet unknown from the San Bernardino Range. The species does not seem to be an abundant one, and several hours' arduous labor in turning over large blocks of stone and clearing out the detritus, repeated on several occasions, have yielded to date only a single adult living specimen, all the remainder being immature or merely dead shells. While probably occurring all through Mill Creek Canyon, and perhaps neighboring parts of the range in favorable situations, only the one slide of the few so far examined has yielded specimens. A find by Mr. Smith of several shells on or near the surface leads to the belief that the species is not always, if ever, of strictly subterranean habit, at least not in the same sense as *Sonorella*.

The two paratypes sent to us by Mr. Berry give the following measurements:

Number of whorls.	Greater diameter.	Altitude.
5.9	28.3	17.0
6.0	28.7	15.4

The following additional adult specimens have been examined. No measurements were taken of pathologic and injured material; hence, most of the specimens called *verna* by Hemphill and all of his *saucius* drop out.

Measurements of Epiphragmophora traskii traskii.

Collection.	Catalogue number.	Number of whorls.	Greater diameter.	Altitude.	Locality.
U.S.N.M.	58553	6.2	26.3	17.4	San Luis Obispo County.
Do.	58553	6.3	27.6	17.3	Do.
Do.	39643	5.8	26.2	15.5	Santa Barbara.
Do.	39643	5.7	24.0	15.0	Do.
Do.	39643	5.8	24.4	13.9	Do.
Do.	39643	5.8	23.9	14.8	Do.
Do.	181313	6.2	28.8	17.4	Little Pine Canyon, Santa Barbara County.
Do.	12336	6.3	30.2	19.0	Santa Barbara.
P.A.N.S.	10700	6.0	21.7	12.5	Do.
U.S.N.M.	58523	6.0	20.3	11.7	Fort Tejon.
P.A.N.S.	10698	6.0	23.0	13.1	Do.
U.S.N.M.	39640a	6.0	26.0	15.4	Hills of Ventura County.
Do.	39640a	5.5	21.9	14.2	Do.
Do.	39640a	5.8	23.7	15.5	Do.
Do.	39640a	5.2	21.2	12.5	Do.

Measurements of Epiphragmophora traskii traskii—Continued.

Collection.	Catalogue number.	Number of whorls.	Greater diameter.	Altitude.	Locality.
U.S.N.M.	39642	6.0	25.0	14.8	Ventura County.
Do.	58559	6.0	21.5	14.3	Near Los Angeles.
Do.	58559	5.7	21.9	12.2	Do.
Do.	58559	5.8	21.6	14.9	Do.
Do.	58559	5.8	21.0	14.3	Do.
Do.	174117	5.5	20.5	13.3	Los Angeles County.
Do.	174117	5.5	22.3	14.1	Do.
Do.	174118	6.2	26.5	17.5	Do.
Do.	174118	6.2	26.1	17.4	Do.
Do.	174119	6.0	28.9	18.6	Do.
Do.	174119	6.2	28.5	17.7	Do.
Do.	174120	5.7	24.4	15.0	Do.
Do.	174120	6.0	24.3	15.8	Do.
Do.	174121	5.7	22.7	15.3	Do.
Do.	174121	5.8	22.0	15.5	Do.
Do.	174122	5.5	21.3	14.0	Do.
Do.	174122	5.7	21.4	14.1	Do.
Do.	174123	5.4	20.0	13.1	Do.
Do.	174123	5.7	19.1	13.0	Do.
Do.	174125	5.5	21.8	13.0	Do.
Do.	174125	5.8	20.9	13.0	Do.
Do.	174126	5.7	24.4	14.5	Do.
Do.	174126	5.5	24.5	14.0	Do.
Do.	174127	5.8	26.1	14.6	Do.
Do.	174127	5.8	25.3	14.5	Do.
Do.	174128	5.8	28.7	16.0	Do.
Do.	174128	6.0	26.5	15.5	Do.
Do.	201207	6.7	28.4	19.8	Artesia, Los Angeles County.
Do.	201207	6.5	29.4	18.6	Do.
Do.	201207	6.5	28.7	18.8	Do.
P.A.N.S.	10685	6.0	23.4	14.8	Los Angeles
Do.	10685	5.8	22.7	14.5	Do.
Do.	10685	5.3	22.9	15.0	Do.
Do.	10685	5.7	23.0	14.3	Do.
Do.	10685	6.0	21.4	14.2	Do.
Do.	10685	5.7	22.2	13.1	Do.
Do.	10685	6.0	22.3	13.2	Do.
Do.	86873	5.7	25.5	16.1	Do.
Do.	86873	6.2	26.7	18.1	Do.
Do.	86874	6.0	26.4	16.8	Do.
Do.	86874	6.0	25.0	16.9	Do.
Do.	86875	6.0	24.0	15.6	Do.
Do.	86875	6.0	24.1	17.2	Do.
Do.	86876	5.7	20.6	13.6	Do.
Do.	86879	5.5	20.5	12.4	Do.
Do.	86879	5.5	22.4	13.5	Do.
Do.	86880	6.0	24.0	14.0	Do.
Do.	86880	5.7	22.0	13.3	Do.
Do.	86881	5.7	25.2	14.8	Do.
Do.	86881	5.8	25.5	14.6	Do.
U.S.N.M.	182627	6.4	26.4	18.0	San Diego.
Average.		5.88	24.07	15.09	
Greatest.		6.7	30.02	19.8	
Least.		5.2	19.1	12.2	

EPIPHRAGMOPHORA TRASKII TULARICA, new subspecies.

Plate 116, figs. 1-3.

Epiphragmophora traskii tularensis (Hemphill) PILSBRY, Man. Conch., 1894, p. 199, *nomen nudum*.

Epiphragmophora traskii tularensis PILSBRY, Clas. Cat. with Loc. Land Shells of Amer. North Mex., 1907, p. 5, *nomen nudum*.

Shell subglobose, very dark colored, with the chestnut band very broad. The axial wrinkling of the nuclear sculpture is very strongly developed, the individual wrinkles being finely granulated. The larger papillations, which form the obliquely protractively slanting lines on the nucleus, are not nearly as strongly developed here as on the other races and require search to be seen. This sculpture does not appear to extend beyond the nuclear turns, but is replaced by the incised spiral sculpture which consists of closely spaced microscopic spiral striations and deeper, distantly, irregularly distributed, stronger lines.

The type and another specimen (Cat. No. 60009, Philadelphia Academy of Natural Sciences Collection) come from Frasers Mills, Tulare County, California. The type has 5.6 whorls and measures, greater diameter, 21 mm.; altitude, 17.4 mm. The other specimen has 5.5 whorls and measures, greater diameter, 21 mm.; altitude, 15.6 mm.

EPIPHRAGMOPHORA TRASKII ZECHAE Pilsbry.

Plate 117, figs. 4-6.

Epiphragmophora traskii zechae PILSBRY, Nautilus, vol. 29, No. 9, pp. 104-5, pl. 3, lower figures (3), Jan., 1916.

Shell very large, decidedly flattened, widely, openly umbilicated, thin. "The whorls of the spire and as far as the front of the last whorl are dilute cinnamon, then changing to ecru-olive or dark olive-buff; there is a chestnut-brown band at the shoulder (about 2 mm. wide), bordered with inconspicuous, hardly noticeable bands paler than the ground color." The characteristic distantly spaced, obliquely protractively arranged papillation is almost obsolete in the nuclear whorls, as well as on the rest of the shell, appearing only as distantly scattered pustules, usually best expressed near the suture, excepting immediately behind the aperture where they are strongly developed on the upper surface and a little less so on the lower. In addition to the papillation the whorls are marked by rather strong incremental lines which are equally developed on the upper and lower surface. No spiral striations are present. Aperture broadly lunate, decidedly wider than high; lip thin, the upper margin scarcely expanded, the outer slightly expanded, the basal very narrowly reflected; columellar margin broadly dilated.

The type (Cat. No. 113426, Philadelphia Academy of Natural Sciences) measures: altitude, 15.2 mm.; diameter, 31 mm.; aperture: altitude, 14.3 mm.; width, 17.8 mm.

Habitat.—San Antonio Canyon, in the San Gabriel Mountains, western edge of San Bernardino County, California, at about 5,000 feet elevation (Miss Lilian Zech).

Miss Zech gives the following account of the locality:

The specimen was found in a narrow, winding canyon branching from the main San Antonio canyon at 4,700 feet, and at this point, some 200 or 300 feet higher, as near as I can guess, only wide enough for the creek bed, then full of rushing water, and the trail. It is a cool, moist, deep canyon, with columbine, lilies, and ferns, and on the slopes much bay laurel. The trees were incense cedar and big cone spruce. The snail lay on a pile of rock artificially heaped up at the creek's mouth and contained the dead animal when found.

EPIPHRAGMOPHORA TRASKII PROLES, new subspecies.

Plate 116, figs. 4-6.

Epiphragmophora traskii proles (Hemphill) PILSBRY, Man. Conch., 1894, p. 199, *nomen nudum*.

Epiphragmophora traskii proles (Hemphill) PILSBRY, Clas. Cat. with Loc. Land Shells of Amer. North Mex., 1907, p. 4, *nomen nudum*.

Shell decidedly flattened, widely, openly umbilicated, thin. The characteristic distantly spaced, obliquely protractively arranged, papillation is almost obsolete in the nuclear whorls as well as in the rest of the shell in the present race. Traces of this sculpture can only be seen on absolutely perfect specimens. Only one individual of all the material examined showed this character, the nuclear whorls in all the rest being slightly worn. The incremental lines of the post-nuclear turns are not strong and the spiral sculpture which consists of exceedingly fine, faintly incised lines, which are best seen on the penultimate whorl, becomes lost on the last turn, both above and on the base.

I have selected one of the three specimens collected by Mr. Henry Hemphill at Frasers Mills, Tulare County, California, which are listed as Cat. No. 62270, Philadelphia Academy of Sciences collection, as type. This has 5.1 whorls and measures—greater diameter, 20.1 mm.; altitude, 11.1 mm.

I have seen the following additional adult specimens:

Measurements of Epiphragmophora traskii proles.

Collection.	Catalogue number.	Number of whorls.	Greater diameter.	Altitude.	Locality.
P.A.N.S	62270	5.2	21.5	11.4	Frasers Mills, Tulare County, California.
Do.....	62270	5.0	19.4	10.2	Do.
Do.....	10702	5.0	20.3	11.0	Clarks, California.
Do.....	10702	5.0	18.7	10.5	Do.
Do.....	10702	4.7	18.0	10.4	Do.
U.S.N.M.....	39644	4.8	18.5	10.3	Mariposa County, California.
Do.....	39644	4.6	18.0	10.4	Do.
Do.....	39644	4.7	17.7	10.2	Do.
Do.....	106779	5.0	19.3	10.6	Clarks Ranch, Mariposa County, California, 65 feet, altitude.
Do.....	¹ 58538	

¹ Two not quite matured from the same place.

EPIPHRAGMOPHORA TRASKII CORONADOENSIS, new subspecies.

Plate 115, figs. 10-12; plate 117, fig. 9.

Epiphragmophora carpenteri PILSBRY (part), Clas. Cat. with Loc. Land Shells of Amer. North Mex., 1907, p. 5.

In this island subspecies the incremental lines are much stronger and the spirally incised lines are much wider and more deeply cut than in the other races. The combination of these sculptural elements give a clothlike texture to the entire surface of the shell.

I have examined the following adult specimens:

Collection.	Catalogue number.	Number of whorls.	Greater diameter.	Altitude.	Locality.
U.S.N.M.....	39649	5.3	20.7	12.4	Coronado Island.
Do.....	30539	5.7	21.9	13.7	Do.
Do.....	58526	5.7	23.6	15.2	Do.
Do.....	58526	6.0	22.4	14.4	Do.
Do.....	58526	5.5	20.6	13.0	Do.
Do.....	58526	6.0	21.7	14.1	Do.
Do.....	58526	5.8	21.5	14.4	Do.

EPIPHRAGMOPHORA TRASKII COELATA, new subspecies.

Plate 115, figs. 7-9; plate 117, fig. 10.

This is a small decidedly inflated race having the inner lip reflected over the very narrow umbilicus covering this half or more than half. All the whorls excepting the last turn are papillose. The spirally incised sculpture is feeble on the upper side of the last one and one-half whorls, and scarcely indicated on the base of the last turn.

The type and another specimen, (Cat. No. 124747, U.S.N.M.) come from the Mesa, at Pacific Beach, California. The type has five and one-third whorls, and measures—greater diameter, 20.8 mm.; altitude, 13.7 mm. The other specimen has four and one-half whorls and measures—greater diameter, 21.8 mm.; altitude, 13.5 mm.

EPIPHRAGMOPHORA TRASKII CARPENTERI Newcomb.

Plate 115, figs. 4-6.

Helix carpenteri NEWCOMB, Proc. California Acad. Sci., vol. 2, 1861, p. 103.

Aglaja carpenteri TRYON, Amer. Journ. Conch., vol. 2, 1866, p. 313.

Arionta carpenteri, W. G. BINNEY, Terr. Moll., vol. 5, 1878, p. 366.

Epiphragmophora carpenteri PILSBRY, Tryon's Man. Conch., vol. 9, 1894, p. 199.

This race was described by Newcomb in the following terms:

Shell umbilicate, roundly conical; apex obtuse, obscurely marked with one brown band; well striated; under the lens numerous very minute spiral striations; whorls five and one-half rounded; suture well marked; aperture circular, with margins approximating; lip moderately expanded, at the columella broadly so, but not adherent. Diameter, 23 mm.; altitude, 16½ mm. Habitat "Tulare Valley." Mus. Cal. Acad. Nat. Sci. My cabinet.

Remarks.—This shell, about the size of *H. ramentosa*, (Gould) can scarcely be confounded with any known species. It belongs to the Cyclostomoid group of Helices, and has the aspect of a desert species. Dedicated to Philip P. Carpenter, L. L. D., of Warrington, England.

The name *Epiphragmophora carpenteri* has been applied to a number of shells to which it did not belong. I believe that the three specimens which Mr. L. J. Goldman of the Biological Survey collected at Maricopa and McKittrick, on the east slope of the Coast Range, belong here and will fix this fleeting name.

The shells are characterized by a very narrow umbilicus, narrower than in any of the other races, except *Epiphragmophora traskii coelata*. The incremental lines are rather coarse, while the wavy spirally incised lines are fine and rather closely spaced.

The two adult specimens measure:

Collection.	Catalogue Number.	Number of whorls.	Greater Diameter.	Altitude.	Locality.
U.S.N.M.	272943	5.4	19.5	12.5	McKittrick, California.
Do.	272942	5.5	21.0	13.7	Maricopa, California.

EPIPHRAGMOPHORA TRASKII PHLYCTAENA, new subspecies.

Plate 115, figs. 1-3; 13-15.

This is a rather large race in which the two whorls following the nuclear turns are strongly papillose, the papillae being much more numerous and much stronger than they are on the nuclear turns.

Cat. No. 12363, U.S.N.M., contains two specimens, cotypes, collected by W. G. Blunt, 40 miles north of Santa Barbara, California. One of these, an adult specimen, has six whorls, and measures—greater diameter, 28.2 mm.; altitude, 17.1 mm. The other, not quite matured, has only five turns, but in this the spiral sculpture is better preserved and has furnished the illustration of that feature.

The following specimens have been examined:

Measurements of Epiphragmophora traskii phlyctaena.

Collection.	Catalogue Number.	Number of whorls.	Greater Diameter.	Altitude.	Locality.
U.S.N.M.	12363	6.0	28.2	17.1	40 miles north of Santa Barbara.
Do.	58516	6.0	23.3	15.0	Santa Barbara.
Do.	58516	6.0	22.8	14.4	Do.
Do.	58516	5.5	18.7	12.8	Do.
Do.	58516	5.7	20.3	12.9	Do.
Do.	39645	5.3	18.7	11.1	Do.
Do.	39645	5.5	18.9	11.8	Do.
Do.	39645	5.3	18.6	11.2	Do.
P.A.N.S.	10699	6.0	25.0	15.3	Do.
Do.	94979	5.8	21.8	14.2	Near Bardsdale, Ventura County.

EPIPHRAGMOPHORA TRASKII ———, subspecies?

The collection of the United States National Museum contains an immature specimen (Cat. No. 106779*a*, U.S.N.M., from Mariposa County, California, which appears to belong to a race differing from those noted above. The papillations disappear shortly beyond the nuclear whorls. The spiral lines on the last whorl are strong and deeply incised on the upper surface and feeble on the lower.

EXPLANATION OF PLATES.

PLATE 114.

All figures on this plate are of *Epiphragmophora traskii traskii* Newcomb.

- FIGS. 1-3. Top profile and bottom of the largest specimen, Cat. No. 12336, U.S.N.M.
 4-6. Top profile and bottom of the smallest specimen, Cat. No. 174123, U.S.N.M.
 7-9. Top profile and bottom of the *norm.*, i. e., the average specimen, Cat. No. 39643, U.S.N.M.
 10-12. (The pathologic form called *Epiphragmophora traskii*, var. *saucius* by Hemphill), Cat. No. 174140 U.S.N.M.
 13-15. (The pathologic form called *Epiphragmophora traskii*, var. *verna* by Hemphill), Cat. No. 174129, U.S.N.M.
 16-18. The tallest specimen, Cat No. 201207, U.S.N.M.

PLATE 115.

- FIGS. 1-3. *Epiphragmophora traskii phlyctaena* Bartsch, type.
 4-6. *Epiphragmophora traskii carpenteri* Newcomb.
 7-9. *Epiphragmophora traskii coelata* Bartsch, type.
 10-12. *Epiphragmophora traskii coronadoensis* Bartsch, type.
 13-15. *Epiphragmophora traskii phlyctaena* Bartsch, type.

PLATE 116.

- FIGS. 1-3. *Epiphragmophora traskii tularica* Bartsch, type.
 4-6. *Epiphragmophora traskii proles* Bartsch, type.
 7-9. *Epiphragmophora traskii traskii* Newcomb, cotype.
 10-12. *Epiphragmophora cuyamacensis cuyamacensis* Bartsch, type.
 13-15. *Epiphragmophora cuyamacensis venturensis* Bartsch, type.
 16-18. *Epiphragmophora cuyamacensis avus* Bartsch, type.

PLATE 117.

- FIGS. 1-3. *Epiphragmophora petricola* Berry, paratype=*Epiphragmophora traskii traskii* Newcomb.
 4-6. *Epiphragmophora traskii zechae* Pilsbry, type.
 7. *Epiphragmophora cuyamacensis venturensis* Bartsch, type. A portion of the base a little behind the aperture, magnified about 25 diameters to show the strong papillations.
 8. *Epiphragmophora cuyamacensis cuyamacensis* Bartsch, type. A portion of the base a little behind the aperture magnified about 25 diameters to show the obsolete papillations.
 9. *Epiphragmophora traskii coronadoensis* Bartsch, type. A portion of the upper surface of the last whorl magnified about 25 diameters to show the clothlike texture.
 10. *Epiphragmophora traskii coelata* Bartsch, type. A portion of the upper surface of the last whorl magnified about 25 diameters to show the absence of clothlike texture.